

Appendix C - Exhibit C2 North Madison to Huiskamp New 138 kV Transmission Line EMF Cross-Reference Table

| Figure Number | Table Number |
|---------------|---|
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| 1 | 1 |
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| 23 | 26 |
| 26 | 27 |
| | 27 |
| 21 | 28 |
| | 1 2 3 4 5 6 7 7 7 8 9 10 10 10 11 11 12 13 14 14 15 16 17 18 19 20 21 22 |

TABLE 1 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| | T | | | |
|------------|-------------|--------------|-------------|--------------|
| Distance | Segment 1 | | | |
| from | Proposed 13 | 8 kV in 2008 | Proposed 13 | 8 kV in 2018 |
| Centerline | (m | ıG) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 43.12 | 56.98 | 97.28 | 121.70 |
| 25 | 26.50 | 35.46 | 61.32 | 76.75 |
| 50 | 10.08 | 13.58 | 23.65 | 29.61 |
| 100 | 2.60 | 3.53 | 6.21 | 7.78 |
| 150 | 1.15 | 1.57 | 2.77 | 3.46 |
| 200 | 0.67 | 0.92 | 1.62 | 2.03 |
| 300 | 0.34 | 0.47 | 0.83 | 1.04 |

Revised 2-09-06

- 1. See Exhibit C1 and Figure 1 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 2 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 56 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 17.33 | 22.32 | 37.00 | 46.23 |
| 25 | 13.97 | 17.98 | 29.82 | 37.25 |
| 50 | 7.94 | 10.22 | 16.94 | 21.16 |
| 100 | 2.88 | 3.71 | 6.14 | 7.67 |
| 150 | 1.41 | 1.80 | 2.99 | 3.73 |
| 200 | 0.82 | 1.06 | 1.75 | 2.18 |
| 300 | 0.38 | 0.49 | 0.81 | 1.01 |

Revised 2-09-06

- 1. See Exhibit C1 and Figure 2 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 3 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 47 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 15.55 | 20.10 | 33.96 | 42.42 |
| 25 | 13.11 | 16.93 | 28.41 | 35.49 |
| 50 | 7.60 | 9.81 | 16.40 | 20.49 |
| 100 | 2.71 | 3.50 | 5.85 | 7.31 |
| 150 | 1.29 | 1.66 | 2.78 | 3.47 |
| 200 | 0.74 | 0.95 | 1.59 | 1.99 |
| 300 | 0.33 | 0.42 | 0.71 | 0.88 |

Revised 2-09-06

- 1. See Exhibit C1 and Figure 3 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 4 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 49 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 19.58 | 25.15 | 40.70 | 50.86 |
| 25 | 15.60 | 20.04 | 32.49 | 40.60 |
| 50 | 8.60 | 11.05 | 18.04 | 22.55 |
| 100 | 3.00 | 3.86 | 6.33 | 7.91 |
| 150 | 1.42 | 1.83 | 3.00 | 3.75 |
| 200 | 0.82 | 1.05 | 1.72 | 2.15 |
| 300 | 0.37 | 0.47 | 0.77 | 0.97 |

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- 1. See Exhibit C1 and Figure 4 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 5 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 58 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 18.65 | 23.98 | 39.81 | 49.78 |
| 25 | 14.64 | 18.84 | 31.23 | 39.04 |
| 50 | 8.23 | 10.59 | 17.56 | 21.94 |
| 100 | 2.92 | 3.75 | 6.23 | 7.78 |
| 150 | 1.39 | 1.79 | 2.97 | 3.70 |
| 200 | 0.80 | 1.02 | 1.70 | 2.12 |
| 300 | 0.36 | 0.46 | 0.76 | 0.95 |

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- 1. See Exhibit C1 and Figure 5 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 6North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 9 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 17.30 | 22.28 | 36.94 | 46.15 |
| 25 | 13.81 | 17.79 | 29.49 | 36.84 |
| 50 | 7.48 | 10.09 | 16.74 | 20.91 |
| 100 | 2.83 | 3.64 | 6.03 | 7.54 |
| 150 | 1.36 | 1.76 | 2.91 | 3.64 |
| 200 | 0.79 | 1.02 | 1.69 | 2.11 |
| 300 | 0.36 | 0.46 | 0.76 | 0.95 |

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- 1. See Exhibit C1 and Figure 6 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 7 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 14 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 18.23 | 23.45 | 38.79 | 48.44 |
| 25 | 14.56 | 18.74 | 31.04 | 38.76 |
| 50 | 8.19 | 10.54 | 17.47 | 21.82 |
| 100 | 2.89 | 3.72 | 6.18 | 7.72 |
| 150 | 1.37 | 1.77 | 2.94 | 3.67 |
| 200 | 0.79 | 1.01 | 1.68 | 2.10 |
| 300 | 0.35 | 0.45 | 0.75 | 0.94 |

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- 1. See Exhibit C1 and Figure 7 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 8 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 26 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 18.07 | 23.28 | 38.57 | 47.80 |
| 25 | 14.39 | 18.54 | 30.72 | 38.20 |
| 50 | 8.09 | 10.43 | 17.28 | 21.51 |
| 100 | 2.87 | 3.70 | 6.13 | 7.62 |
| 150 | 1.37 | 1.76 | 2.92 | 3.62 |
| 200 | 0.78 | 1.01 | 1.67 | 2.07 |
| 300 | 0.35 | 0.45 | 0.75 | 0.92 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 7 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 9 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 32 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 42.22 | 54.35 | 90.11 | 112.58 |
| 25 | 26.44 | 34.04 | 56.43 | 70.50 |
| 50 | 11.42 | 14.70 | 24.38 | 30.46 |
| 100 | 3.51 | 4.51 | 7.48 | 9.35 |
| 150 | 1.67 | 2.15 | 3.56 | 4.45 |
| 200 | 0.99 | 1.27 | 2.11 | 2.63 |
| 300 | 0.48 | 0.62 | 1.04 | 1.29 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 8 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 10 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 61 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 17.08 | 22.02 | 36.60 | 45.71 |
| 25 | 13.70 | 17.68 | 29.41 | 36.73 |
| 50 | 7.77 | 10.03 | 16.68 | 20.83 |
| 100 | 2.81 | 3.62 | 6.02 | 7.51 |
| 150 | 1.36 | 1.75 | 2.91 | 3.64 |
| 200 | 0.79 | 1.02 | 1.69 | 2.11 |
| 300 | 0.36 | 0.47 | 0.77 | 0.97 |

Revised 02-09-06

- 4. See Exhibit C1 and Figure 9 for segment location, configuration of circuits in this segment and line loadings.
- 5. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 6. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 11 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 35a | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 16.32 | 21.05 | 35.61 | 44.51 |
| 25 | 13.10 | 16.86 | 28.21 | 35.28 |
| 50 | 7.43 | 9.57 | 15.98 | 19.99 |
| 100 | 2.65 | 3.41 | 5.69 | 7.12 |
| 150 | 1.26 | 1.62 | 2.71 | 3.39 |
| 200 | 0.72 | 0.93 | 1.55 | 1.94 |
| 300 | 0.32 | 0.41 | 0.68 | 0.86 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 10 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 12 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 35b | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 15.51 | 19.99 | 34.46 | 45.98 |
| 25 | 12.81 | 16.49 | 27.83 | 36.29 |
| 50 | 7.28 | 9.37 | 15.80 | 20.42 |
| 100 | 2.59 | 3.33 | 5.63 | 7.25 |
| 150 | 1.24 | 1.59 | 2.68 | 3.46 |
| 200 | 0.71 | 0.92 | 1.54 | 1.99 |
| 300 | 0.32 | 0.41 | 0.68 | 0.89 |

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- 1. See Exhibit C1 and Figure 10 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 13 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 36 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 11.52 | 14.70 | 24.96 | 32.17 |
| 25 | 8.08 | 11.05 | 21.54 | 27.73 |
| 50 | 3.90 | 5.61 | 12.06 | 15.49 |
| 100 | 1.09 | 1.67 | 4.05 | 5.19 |
| 150 | 0.44 | 0.71 | 1.84 | 2.36 |
| 200 | 0.23 | 0.37 | 1.02 | 1.31 |
| 300 | 0.09 | 0.15 | 0.43 | 0.56 |

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- 1. See Exhibit C1 and Figure 11 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 14 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 2a | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 42.25 | 54.40 | 90.19 | 112.67 |
| 25 | 26.47 | 34.07 | 56.49 | 70.58 |
| 50 | 11.44 | 14.72 | 24.41 | 30.50 |
| 100 | 3.51 | 4.52 | 7.50 | 9.37 |
| 150 | 1.67 | 2.15 | 3.57 | 4.46 |
| 200 | 0.99 | 1.28 | 2.12 | 2.65 |
| 300 | 0.49 | 0.63 | 1.04 | 1.30 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 12 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 15 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 2b | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 31.57 | 40.13 | 54.95 | 68.66 |
| 25 | 20.11 | 25.63 | 36.55 | 45.66 |
| 50 | 10.31 | 13.16 | 19.28 | 24.09 |
| 100 | 3.67 | 4.69 | 6.72 | 8.40 |
| 150 | 1.80 | 2.30 | 3.18 | 3.97 |
| 200 | 1.06 | 1.36 | 1.81 | 2.26 |
| 300 | 0.50 | 0.64 | 0.79 | 0.98 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 13 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 16 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 3 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 17.64 | 22.75 | 37.48 | 47.35 |
| 25 | 13.82 | 17.85 | 29.61 | 37.27 |
| 50 | 7.67 | 9.91 | 16.52 | 20.75 |
| 100 | 2.64 | 3.42 | 5.72 | 7.20 |
| 150 | 1.21 | 1.57 | 2.64 | 3.34 |
| 200 | 0.67 | 0.87 | 1.47 | 1.86 |
| 300 | 0.27 | 0.35 | 0.60 | 0.77 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 14 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 17 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 43a-1 | | | |
|------------|---------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 17.93 | 23.09 | 38.41 | 48.01 |
| 25 | 14.20 | 18.29 | 30.46 | 38.09 |
| 50 | 7.94 | 10.23 | 17.07 | 21.35 |
| 100 | 2.78 | 3.59 | 6.00 | 7.51 |
| 150 | 1.31 | 1.69 | 2.83 | 3.55 |
| 200 | 0.74 | 0.95 | 1.61 | 2.01 |
| 300 | 0.32 | 0.41 | 0.70 | 0.88 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 14 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 18 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 43a-2 | | | |
|------------|---------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 42.22 | 54.35 | 90.11 | 112.58 |
| 25 | 26.44 | 34.04 | 56.43 | 70.50 |
| 50 | 11.42 | 14.70 | 24.38 | 30.46 |
| 100 | 3.51 | 4.51 | 7.48 | 9.35 |
| 150 | 1.67 | 2.15 | 3.56 | 4.45 |
| 200 | 0.99 | 1.27 | 2.11 | 2.63 |
| 300 | 0.48 | 0.62 | 1.04 | 1.29 |

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- 1. See Exhibit C1 and Figure 15 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 19 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 43a-3 | | | |
|------------|---------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 18.09 | 23.31 | 38.62 | 48.28 |
| 25 | 14.39 | 18.55 | 30.72 | 38.41 |
| 50 | 8.08 | 10.42 | 17.26 | 21.59 |
| 100 | 2.86 | 3.69 | 6.10 | 7.64 |
| 150 | 1.36 | 1.75 | 2.90 | 3.63 |
| 200 | 0.78 | 1.00 | 1.66 | 2.08 |
| 300 | 0.34 | 0.44 | 0.73 | 0.92 |

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- 1. See Exhibit C1 and Figure 16 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 20 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 45 | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | - | (G) | _ | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 42.22 | 54.36 | 90.11 | 112.58 |
| 25 | 26.44 | 34.04 | 56.43 | 70.50 |
| 50 | 11.42 | 14.70 | 24.38 | 30.46 |
| 100 | 3.51 | 4.51 | 7.48 | 9.35 |
| 150 | 1.67 | 2.15 | 3.56 | 4.45 |
| 200 | 0.99 | 1.27 | 2.11 | 2.63 |
| 300 | 0.48 | 0.62 | 1.04 | 1.29 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 17 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 21 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 8b-1 | | | |
|------------|--------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 42.22 | 54.35 | 90.11 | 112.58 |
| 25 | 26.44 | 34.04 | 56.43 | 70.50 |
| 50 | 11.42 | 14.70 | 24.38 | 30.46 |
| 100 | 3.51 | 4.51 | 7.48 | 9.35 |
| 150 | 1.67 | 2.15 | 3.56 | 4.45 |
| 200 | 0.99 | 1.27 | 2.11 | 2.63 |
| 300 | 0.48 | 0.62 | 1.04 | 1.29 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 18 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 22 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 8b-2 | | | |
|------------|--------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | G) | (m | G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 18.60 | 23.92 | 39.66 | 49.54 |
| 25 | 14.82 | 19.06 | 31.58 | 39.47 |
| 50 | 8.35 | 10.74 | 17.80 | 22.24 |
| 100 | 2.97 | 3.82 | 6.32 | 7.90 |
| 150 | 1.42 | 1.83 | 3.02 | 3.78 |
| 200 | 0.82 | 1.05 | 1.75 | 2.18 |
| 300 | 0.38 | 0.48 | 0.80 | 1.00 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 19 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 23 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 13a | | | |
|------------|-------------|--------------|-------------------------|-------------|
| from | Proposed 13 | 8 kV in 2008 | Proposed 138 kV in 2018 | |
| Centerline | (m | (G) | (m | (G) |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 38.48 | 48.16 | 47.24 | 64.14 |
| 25 | 28.05 | 35.34 | 39.87 | 52.11 |
| 50 | 13.38 | 16.92 | 20.21 | 25.74 |
| 100 | 4.38 | 5.55 | 6.68 | 8.41 |
| 150 | 2.16 | 2.74 | 3.17 | 3.98 |
| 200 | 1.33 | 1.68 | 1.85 | 2.32 |
| 300 | 0.70 | 0.88 | 0.88 | 1.11 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 20 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 24 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segments 13b | | | |
|------------|-------------------------|-------------|-------------------------|-------------|
| from | Proposed 138 kV in 2008 | | Proposed 138 kV in 2018 | |
| Centerline | (mG) | | (mG) | |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 38.51 | 48.19 | 44.75 | 55.98 |
| 25 | 28.09 | 35.49 | 38.63 | 48.36 |
| 50 | 13.44 | 17.03 | 20.06 | 25.14 |
| 100 | 4.43 | 5.61 | 6.72 | 8.44 |
| 150 | 2.19 | 2.77 | 3.21 | 4.04 |
| 200 | 1.35 | 1.71 | 1.88 | 2.38 |
| 300 | 0.71 | 0.90 | 0.91 | 1.15 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 21 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 25 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segment 24 | | | |
|------------|-------------------------|-------------|-------------------------|-------------|
| from | Proposed 138 kV in 2008 | | Proposed 138 kV in 2018 | |
| Centerline | (mG) | | (mG) | |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 42.22 | 54.35 | 90.11 | 112.58 |
| 25 | 26.44 | 34.04 | 56.43 | 70.50 |
| 50 | 11.42 | 14.70 | 24.38 | 30.46 |
| 100 | 3.51 | 4.51 | 7.48 | 9.35 |
| 150 | 1.67 | 2.15 | 3.56 | 4.45 |
| 200 | 0.99 | 1.27 | 2.11 | 2.63 |
| 300 | 0.48 | 0.62 | 1.04 | 1.29 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 22 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 26 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels

| Distance | Segments 27, 31 & 34 | | | |
|------------|-------------------------|-------------|-------------------------|-------------|
| from | Proposed 138 kV in 2008 | | Proposed 138 kV in 2018 | |
| Centerline | (mG) | | (mG) | |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 29.65 | 37.33 | 63.32 | 79.08 |
| 25 | 14.93 | 20.76 | 42.55 | 53.13 |
| 50 | 5.01 | 7.43 | 17.00 | 21.21 |
| 100 | 1.09 | 1.76 | 4.58 | 5.71 |
| 150 | 0.42 | 0.71 | 2.01 | 2.50 |
| 200 | 0.21 | 0.37 | 1.13 | 1.41 |
| 300 | 0.08 | 0.16 | 0.53 | 0.66 |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 23 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 27 North Madison – Huiskamp 138 kV Line Calculated Magnetic Field Levels

Existing North Madison to Yarha 138 kV Line

| Distance | Segment 1 | | | |
|------------|-------------------------|-------------|-------------------------|-------------|
| from | Proposed 138 kV in 2008 | | Proposed 138 kV in 2018 | |
| Centerline | (mG) | | (mG) | |
| (feet) | Normal Load | Normal Peak | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | | (421 amps) | | (872 amps) |
| 0 | 58.49 | 77.29 | | |
| 25 | 36.02 | 47.60 | | |
| 50 | 15.55 | 20.54 | | |
| 100 | 4.73 | 6.26 | | |
| 150 | 2.21 | 2.92 | | |
| 200 | 1.27 | 1.68 | | |
| 300 | 0.58 | 0.77 | | |

Revised 02-09-06

- 1. See Exhibit C1 and Figure 26 for segment location, configuration of circuits in this segment and line loadings.
- 2. "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3. The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

TABLE 28 North Madison - Huiskamp138 kV Line Calculated Magnetic Field Levels Existing Waunakee to Huiskamp 69 kV Line

| Distance | Segments 27, 31, 34 & 36 | | | |
|------------|--------------------------|------------|------------------------|-------------|
| from | Proposed 69 kV in 2008 | | Proposed 69 kV in 2018 | |
| Centerline | (mG) | | (mG) | |
| (feet) | Normal Load Normal Peak | | Normal Load | Normal Peak |
| | (327 amps) | Load | (698 amps) | Load |
| | _ | (421 amps) | _ | (872 amps) |
| 0 | 51.06 | 58.86 | | |
| 25 | 26.01 | 30.00 | | |
| 50 | 10.09 | 11.64 | | |
| 100 | 2.90 | 3.35 | | |
| 150 | 1.33 | 1.54 | | |
| 200 | 0.76 | 0.88 | | |
| 300 | 0.35 | 0.40 | | |

Revised 02-09-06

- 1 See Exhibit C1 and Figure 27 for segment locations, configuration of circuits in this segment and line loadings.
- 2 "Normal Peak Load" is defined as 100% of estimated peak, system normal configuration and "Normal Load" is defined as 80% of estimated peak, system in normal configuration.
- 3 The magnetic field values shown represent the highest magnetic field RMS resultant at the specified distance from the centerline of the line as calculated by EPRI's ACDCLINE program at a distance of one meter above ground.

©AMERICAN TRANSMISSION COMPANY 2004 ER-10-000059-001 Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height Transmission sags are based on 500 ft ruling span. 3. Transmission energized at 138 kV in 2008. **NORTH MADISON - HUISKAMP GENERAL DRAWINGS** TRANSMISSION **EMF FIGURES** A= 0 deg B= 240 deg C= 120 deg ᄶ at pole. Note: ENGINEERING RECORD DRAWING No. TRANSMISSION CURRENT FLOW IS EAST AS LOOKING DIRECTION INDICATES 12 fiber OPGW (.551") 477 T2-Hawk B (26/7) ACSR Shieldwire SEGMENT 1 - LOOKING EAST TOWARD WIBU ROAD LOOKING TOWARD HUISKAMP SUBSTATION O NMA-HKP £ 4 FIGURE . 0-9 NMA-YAR THE ENERGY ACCESS COMPANY Œ AMERICAN TRANSMISSION COMPANY THIS DOCUMENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY.
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AMERICAN TRANSMISSION COMPANY IS AT THEIR COMP RISK. Ω 7/6 EHS Steel ⋖ O (26/7) ACSR 477 T2-Hawk (Typical Midspan) 6، 24.-8" 6، 6، TRANSMISSION NMA - HKP 138 KV LINE (Right Side) FLOW IS EAST TRANSMISSION NMA-YAR 138 KV LINE (Left Side) FLOW IS EAST 02-08-06 I= 479 amps 2018 Normal Peak 2008 Normal Peak 2018 Normal Peak I= 1351 amps l= 1080 amps 2008 Normal Peak l= 633 amps l= 327 amps I= 872 amps I= 698 amps l= 421 amps SEGMENT 1 SEGMENT 1 Normal Normal Normal Normal SCALE NTS REVISION

©AMERICAN TRANSMISSION COMPANY 2004 ER-10- 000059-002 Stated dimensions are at midspan, add 14"-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 3. Distribution conductors are supported by midspan structure. 2. Transmission sags are based on 500 ft ruling span. **NORTH MADISON - HUISKAMP** 4. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS FRANSMISSION** DISTRIBUTION **EMF FIGURES** A= 330 deg B= 210 deg C= 90 deg A= 0 deg B= 240 deg C= 120 deg ΚĒΥ ENGINEERING RECORD DRAWING No. TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 56 - LOOKING SOUTH ALONG WEST SIDE OF WIBU ROAD (Typical Midspan) 36.-S. <u>..0-.6</u> <u>"0-'8</u> **"**0-.9 LOOKING TOWARD HUISKAMP SUBSTATION (Typical Midspan) ا6، ,9 £ FIGURE 2 THE ENERGY ACCESS COMPANY **AMERICAN TRANSMISSION COMPANY** 0 THIS DOCUMENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY. AMERICAN TRANSMISSION COMPANY. BOTH EQPRESS AND IMPLED. USE BY ANYONE OTHER THAN MERICAN TRANSMISSION COMPANY IS AT THERE ONM RISK. S I 12 fiber OPGW (.551") Shieldwire Alliant Energy 266 Waxwing (18/1) ACSR 477 T2-Hawk (26/7) ACSR B 1 12.47 kV 1-PHASE DISTRIBUTION FLOW SOUTH NMA - HKP 138 KV LINE FLOW IS SOUTH ALLIANT ENERGY 2008 Normal Peak 2008 Normal Peak 2018 Normal Peak 2018 Normal Peak **TRANSMISSION** 02-08-06 I= 421 amps l= 327 amps I= 872 amps l= 698 amps l= 12 amps SEGMENT 56 I= 10 amps SEGMENT 56 l= 6 amps l= 5 amps Normal Normal Normal Normal SCALE SE REVISION \$ewn\s\$

LOOKING TOWARD HUISKAMP SUBSTATION (Typical Midspan) 9 16، 6-2 £ 7 6-0 FIGURE 3 ģ 0 2-8 \odot 3-6 12 fiber OPGW (.551") Alliant Energy O (6/1) ACSR #1 Robin 477 T2-Hawk (26/7) ACSR B Shieldwire ALLIANT ENERGY 12.47 kV 3-PHASE DISTRIBUTION FLOW IS SOUTH NMA - HKP 138 KV LINE FLOW IS SOUTH 2008 Normal Peak 2018 Normal Peak 2008 Normal Peak 2018 Normal Peak **TRANSMISSION** l= 327 amps l= 421 amps I= 872 amps l= 698 amps I= 44 amps l= 80 amps **SEGMENT 47** = 35 amps l= 64 amps SEGMENT 47 Normal Normal Normal Normal

Note:

Stated dimensions are at midspan, add 14'4" it to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole.

.0-.6

- Transmission sags are based on 500 ft ruling span.
- Distribution conductors are supported by midspan structure.
- 4. Transmission energized at 138 kV in 2008.

..0-.9

.0-.9

TRANSMISSION

A= 0 deg B= 240 deg C= 120 deg 而

(Typical Midspan)

36.-4"

DISTRIBUTION

A= 330 deg B= 210 deg C= 90 deg 至

SEGMENT 47 - LOOKING SOUTH ALONG THE WEST SIDE OF COUNTY HIGHWAY I FROM COUNTY HIGHWAY V TO NORWAY GROVE SCHOOL ROAD

FRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES

02-08-06

REVISION

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NORTH MADISON - HUISKAMP ENGINEERING RECORD DRAWING No.

GENERAL DRAWINGS

EMF FIGURES

ER-10-000059-003

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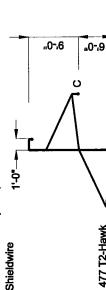
NMA - HKP 138 KV LINE FLOW IS SOUTH TRANSMISSION

2018 Normal Peak 2008 Normal Peak i= 327 amps I= 421 amps I= 698 amps l= 872 amps **SEGMENT 49** Normal Normal

ALLIANT ENERGY 12.47 kV 3-PHASE DISTRIBUTION FLOW IS SOUTH

2008 Normal Peak 2018 Normal Peak I= 49 amps Normal SEGMENT 49 l= 35 amps l= 39 amps l= 28 amps Normal

12 fiber OPGW (.551")



transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 1. Stated dimensions are at midspan, add 14'-4" ft. to the

Note:

Transmission sags are based on 500 ft ruling span.

3. Distribution conductors are supported by midspan structure.

4. Transmission energized at 138 kV in 2008.

.0-.9

477 T2-Hawk (26/7) ACSR B **f**

TRANSMISSION

A= 0 deg B= 240 deg C= 120 deg る人

DISTRIBUTION

(Typical Midspan) .Z-.6E

Alliant Energy

(6/1) ACSR #1 Robin

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(Typical Midspan)

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A= 330 deg B= 210 deg C= 90 deg

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LOOKING TOWARD HUISKAMP SUBSTATION

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SEGMENT 49 - LOOKING SOUTH ALONG THE EAST OR WEST SIDE OF COUNTY HIGHWAY I FROM NORWAY GROVE SCHOOL ROAD TO CUBA VALLEY ROAD

TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES

FIGURE 4

02-08-06

REVISION



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AMERICAN TRANSMISSION COMPANY THE ENERGY ACCESS COMPANY

ENGINEERING RECORD DRAWING No.

GENERAL DRAWINGS

EMF FIGURES

ER-10-000059-004 **NORTH MADISON - HUISKAMP**

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ER-10-000059-005 transmission conductor and Shieldwire dimensions for helght at pole. For distribution conductors add 5 ft for height at pole. 3. Distribution conductors are supported by midspan structure. 1. Stated dimensions are at midspan, add 14'4" ft. to the Transmission sags are based on 500 ft ruling span. **NORTH MADISON - HUISKAMP** 4. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS TRANSMISSION** DISTRIBUTION A= 330 deg B= 210 deg C= 90 deg **EMF FIGURES** A= 0 deg B= 240 deg C= 120 deg 乔 SEGMENT 58 - LOOKING SOUTH ALONG THE WEST SIDE OF COUNTY HIGHWAY I FROM CUBA VALLEY ROAD TO EASY STREET ENGINEERING RECORD DRAWING No. Note: FRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES (Typical Midspan) .Z-.6E ..0-.9 ..0-.6 9-0_ (Typical Midspan) 16، LOOKING TOWARD HUISKAMP SUBSTATION .9 ⋖ ပ 6'-2" ${\mathfrak E}$. 0, 0, FIGURE 5 ģ THE ENERGY ACCESS COMPANY AMERICAN TRANSMISSION COMPANY 0 2-8 AMERICAN TRANSMISSION COMPANY. T DISCLAMS ALL WARRANTIES Y ANYONE OTHER THAN \odot 3,0 12 fiber OPGW (.551") Alliant Energy (6/1) ACSR #1 Robin 477 T2-Hawk (26/7) ACSR B 1 Shieldwire ALLIANT ENERGY 12.47 KV 3-PHASE DISTRIBUTION FLOW IS SOUTH NIMA - HKP 138 KV LINE FLOW IS SOUTH 02-08-06 2018 Normal Peak **TRANSMISSION** 2008 Normal Peak 2018 Normal Peak 2008 Normal Peak l= 327 amps l= 25 amps Normal l= 421 amps I= 872 amps l= 698 amps SEGMENT 58 SEGMENT 58 l= 20 amps l= 9 amps Normal Normal Normal SCALE SIN REVISION 2sytime\$

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©AMERICAN TRANSMISSION COMPANY 2004 ER-10-000059-006 Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 3. Distribution conductors are supported by midspan structure. 2. Transmission sags are based on 500 ft ruling span. **NORTH MADISON - HUISKAMP** 4. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS** TRANSMISSION DISTRIBUTION A= 330 deg B= 210 deg C= 90 deg **EMF FIGURES** 0 deg A= 0 deg B= 240 deg C= 120 deg ᄶ ENGINEERING RECORD DRAWING No. Note: SEGMENT 9 - LOOKING WEST ON SOUTH SIDE OF COUNTY HIGHWAY I (EASY STREET) TRANSMISSION CURRENT FLOW IS WEST AS LOOKING DIRECTION INDICATES (Typical Midspan) .0-.6 ..Z-.6E ..0-.9 "0-'8 LOOKING TOWARD HUISKAMP SUBSTATION (Typical Midspan) ١6، 9، α 6'-2" £ 7. FIGURE 6 AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY 2.8 MAERICAN TRANSMISSION COMPANY. DISCLAIMS ALL WARRANTIES . 9 8 \odot 3,0 12 fiber OPGW (.551") Alliant Energy 336 Merlin (18/1) ACSR 477 T2-Hawk (26/7) ACSR Shieldwire 12.47 KV 3-PHASE DISTRIBUTION FLOW IS WEST TRANSMISSION NMA - HKP 138 KV LINE FLOW IS WEST **ALLIANT ENERGY** 2008 Normal Peak 2018 Normal Peak 2008 Normal Peak 2018 Normal Peak l= 327 amps l= 872 amps l= 421 amps l= 698 amps 02-08-06 l= 10 amps I= 20 amps l= 16 amps SEGMENT 9 SEGMENT 9 l= 8 amps Normal Normal Normal Normal SCALE Š REVISION **Հ**ՅԱՐԱԳ**Հ**

NMA - HKP 138 KV LINE FLOW IS SOUTH TRANSMISSION

SEGMENT 14 & 26 2008 Normal Peak 2018 Normal Peak l= 421 amps l= 327amps l= 872 amps Noma

12.47 KV 1-PHASE DISTRIBUTION FLOW IS SOUTH **ALLIANT ENERGY**

I= 698 amps

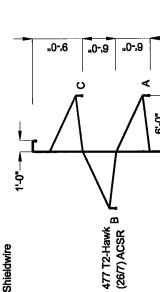
Normal

2008 Normal Peak 2018 Normal Peak **SEGMENT 14** I= 2.5 amps l= 3 amps l= 6 amps l= 5 amps Normal Normal

12.47 kV 1-PHASE DISTRIBUTION **ALLIANT ENERGY** FLOW IS NORTH

2008 Normal Peak 2018 Normal Peak SEGMENT 26 = 2 amps l= 1 amps l= 2 amps = 1 amps Normal Normal

12 fiber OPGW (.551")



- Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole.
- Transmission sags are based on 500 ft ruling span.
- 3. Distribution conductors are supported by midspan structure.
- 4. Transmission energized at 138 kV in 2008.

TRANSMISSION

A= 0 deg B= 240 deg C= 120 deg

DISTRIBUTION

(Typical Midspan) ..Z-.6E

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Alliant Energy

(6/1) ACSR % RAVEN

(Typical Midspan) ١6،

A= 330 deg B= 210 deg C= 90 deg ᄍ

LOOKING TOWARD HUISKAMP SUBSTATION

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SEGMENT 14 - LOOKING SOUTH ALONG EAST OR WEST SIDE OF COUNTY HIGHWAY I BETWEEN EASY STREET AND STATE HIGHWAY 19 SEGMENT 26 - LOOKING SOUTH ALONG EAST SIDE OF STATE HIGHWAY 113 TO BONG ROAD

TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES

FIGURE 7

02-08-06

REVISION

SCALE

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ENGINEERING RECORD DRAWING No.

NORTH MADISON - HUISKAMP GENERAL DRAWINGS EMF FIGURES

ER-10- 000059 -007

©AMERICAN TRANSMISSION COMPANY 2004 ER-10-000059-008 Stated dimensions are at midspan, add 18"-2" ft. to the transmission conductor and Shieldwire dimensions for height at pole. **NORTH MADISON - HUISKAMP** 2. Transmission sags are based on 600 ft ruling span. **GENERAL DRAWINGS** TRANSMISSION 3. Transmission energized at 138 kV in 2008. **EMF FIGURES** A= 0 deg B= 240 deg C= 120 deg ENGINEERING RECORD DRAWING No. Note: TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 32- LOOKING SOUTH ALONG THE EAST SIDE OF STATE HIGHWAY 113 (Typical Midspan) .01-.97 .0-.6 ..0-.9 <u>..0-.9</u> LOOKING TOWARD HUISKAMP SUBSTATION £ . 0-9 FIGURE 8 AMERICAN TRANSMISSION COMPANY THE ENERGY ACCESS COMPANY THIS DOCUMENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY. MARRICION TRANSMISSION COMPANY TO COMPANY TO SEE OF SECURIAL MARRIMISSION COMPANY TO SEE OF PROPRESS AND IMPLED. USE BY ANYONE OTHER THAN MARRICON TRANSMISSION COMPANY IS AT THEIR OWN RISK. Œ 12 fiber OPGW (.551") 477 T2-Hawk B **f** (26/7) ACSR Shieldwire NMA - HKP 138 KV LINE FLOW IS SOUTH 2008 Normal Peak 2018 Normal Peak **TRANSMISSION** 02-08-06 l= 327 amps l= 872 amps l= 698 amps SEGMENT 32 Normal Normal SCALE SE REVISION

©AMERICAN TRANSMISSION COMPANY 2004 ER-10-000059-009 Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 3. Distribution conductors are supported by midspan structure. Transmission sags are based on 500 ft ruling span. **NORTH MADISON - HUISKAMP** 4. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS** TRANSMISSION DISTRIBUTION A= 330 deg B= 210 deg C= 90 deg **EMF FIGURES** o deg A= 0 deg B= 240 deg C= 120 deg 而 ᄶ ENGINEERING RECORD DRAWING No. Note: TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 61 - LOOKING SOUTH ALONG THE EAST SIDE OF STATE HIGHWAY 113 (Typical Midspan) ..0-.9 .Z-.6E ..0~.6 ..0-.9 LOOKING TOWARD HUISKAMP SUBSTATION (Typical Midspan) .9 **.6۱** £ . 9-9 FIGURE 9 50 AMERICAN TRANSMISSION COMPANY THE ENERGY ACCESS COMPANY 0 THIS DOCUMENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY. AMERICAN TRANSMISSION COMPANY DISCLAMS ALL WARRANTIES BOTH EURPRESS AND IMPLED. USE BY ANYONE OTHER THAN AMERICAN TRANSMISSION COMPANY IS AT THEIR COMP RISK ٤ ∀ \odot 12 fiber OPGW (.551") Madison Gas & 477 Cosmos 477 T2-Hawk B (26/7) ACSR (19 str) AAC Electric Shieldwire MADISON GAS & ELECTRIC 13.8 KV 1-PHASE DISTRIBUTION FLOW IS NORTH NMA - HKP 138 KV LINE FLOW IS SOUTH l= 3 amps 2018 Normal Peak 2018 Normal Peak 2008 Normal Peak 2008 Normal Peak 02-08-06 l= 421 amps l= 327 amps l= 872 amps 698 amps (= 3 amps SEGMENT 61 **SEGMENT 61** l= 4 amps Normai Normal Normal Normal

TRANSMISSION

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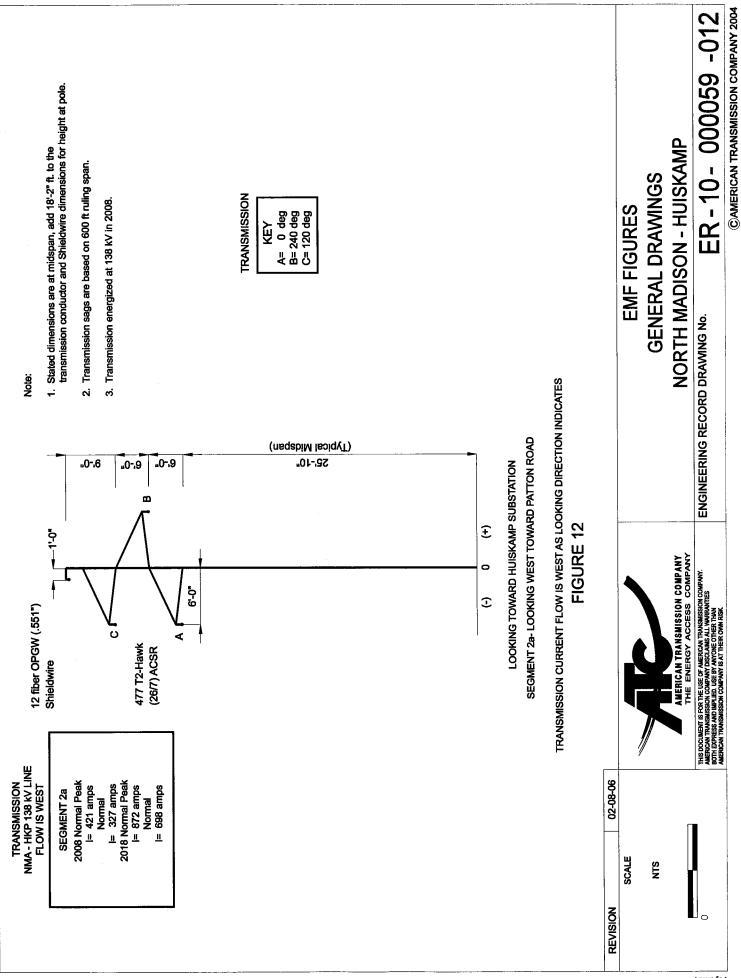
SCALE

REVISION

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©AMERICAN TRANSMISSION COMPANY 2004 ER-10- 000059 -010 Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 3. Distribution conductors are supported by midspan structure. 2. Transmission sags are based on 500 ft ruling span. **NORTH MADISON - HUISKAMP** 4. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS** TRANSMISSION DISTRIBUTION A= 330 deg B= 210 deg C= 90 deg **EMF FIGURES** A= 0 deg B= 240 deg C= 120 deg 至 TRANSMISSION CURRENT FLOW IS WEST OR SOUTH AS LOOKING DIRECTION INDICATES ENGINEERING RECORD DRAWING No. Note: SEGMENT 35a - LOOKING SOUTH ON EAST SIDE OF STATE HIGHWAY 113 SEGMENT 35b - LOOKING EAST ON RIVER ROAD TO Y132 LINE LOOKING TOWARD HUISKAMP SUBSTATION (Typical Midspan) ..Z-.6E <u>"0-'8</u> ..0-.6 .0-.9 (Typical Midspan) FIGURE 10 ا6، 3-0 £ z .. 9 2 2 **AMERICAN TRANSMISSION COMPANY** THE ENERGY ACCESS COMPANY 0 2-6 THIS DOCIMIENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY. AMERICAN TRANSMISSION COMPANY TRANSMISSION BOTH EXPRESS AND IMPLED. USE BY ANYONE OTHER THAN AMERICAN TRANSMISSION COMPANY IS AT THER OWN NISK. œ \odot 30 Madison Gas & Electric 12 fiber OPGW (.551") 477 T2-Hawk (26/7) ACSR B **f** 477 Cosmos (19str) AAC Shieldwire MADISON GAS & ELECTRIC 13.8 KV 3-PHASE DISTRIBUTION FLOW IS EAST 13.8 KV 3-PHASE DISTRIBUTION FLOW IS NORTH MADISON GAS & ELECTRIC NIMA - HKP 138 KV LINE FLOW IS WEST OR SOUTH SEGMENT 35a & 35b 2008 Normal Peak 2018 Normal Peak 2008 Normal Peak 2018 Normal Peak 2008 Normal Peak 2018 Normal Peak 02-08-06 = 327 amps I= 421 amps I= 872 amps I= 698 amps SEGMENT 35b l= 39 amps SEGMENT 35a I= 22 amps l= 18 amps I= 26 amps l= 49 amps l= 59 amps l= 21 amps |= 47 amps Normal Normal Normal Normal Normal Normal SCALE SE SE REVISION

©AMERICAN TRANSMISSION COMPANY 2004 Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. ER-10-000059-011 3. Distribution conductors are are supported by midspan structure. **TRANSMISSION** DISTRIBUTION A= 330 deg B= 210 deg C= 90 deg 0 deg B= 240 deg C= 120 deg For Distribution conductors add 5 ft. for hieght at pole. 至 至 Transmission sags are based on 500 ft ruling span. Transmission energized at 138 kV in 2008. **NORTH MADISON - HUISKAMP** SEGMENTS 36- LOOKING SOUTHEAST ALONG THE SOUTH SIDE OF CANW RAILROAD TRACKS TOWARD HUISKAMP SUBSTATION **GENERAL DRAWINGS EMF FIGURES** TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES Note: ENGINEERING RECORD DRAWING No. 477 T2-Hawk (26/7) ACSR OPGW(.551") $\widehat{\pm}$ 12 Fibers NMA-HKP ပ 8 ပ z **5**-6 FIGURE 11 0 2.-6 . 9 4 B 3-0" 7/16" EHS ပ 8 HKP-WPK (Y132) ⋖ 477 T2-Hawk (26/7) ACSR AMERICAN TRANSMISSION COMPANY THE ENERGY ACCESS COMPANY \odot (Typical Midspan) THIS DOCUMENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY.
AMERICAN TRANSMISSION COMPANY ESCA AMERICAN TRANSMISSION
BOTH EDPRESS AND BIFLED. USE BY ANYONE OTHER THAN
MERICAN TRANSMISSION COMPANY IS AT THER OWN RISK. ا6، (Typical Midspan) 6، 6، 6، Madison Gas & Electric 477 Cosmos (19str) AAC 02-08-06 MADISON GAS & ELECTRIC 13.8 KV 3-PHASE DISTRIBUTION HKP-WPK (Y132) 69 KV LINE FLOW IS NORTH NMA - HKP 138 KV LINE FLOW IS NORTH 2008 Normal Peak 2018 Normal Peak FLOW IS SOUTH **IRANSMISSION** 2008 Normal Peak 2018 Normal Peak **IRANSMISSION** 2008 Normal Peak 2018 Normal Peak l= 327 amps l= 421 amps I= 872 amps l= 698 amps l= 323 amps l= 281 amps l= 443 amps l= 354 amps l= 40 amps l= 59 amps l= 48 amps SEGMENT 36 SEGMENT 36 l= 49 amps SEGMENT 36 Normal Normal Normal Normal Normal Normal SCALE NTS REVISION



Note:

12 fiber OPGW (.551")

NMA - HKP 138 KV LINE FLOW IS SOUTH

TRANSMISSION

2008 Normal Peak

SEGMENT 2b

(= 421 amps

2018 Normal Peak

l= 872 amps 698 amps

Normal

11

l= 327 amps

Normal

Shieldwire

- 1. Stated dimensions are at midspan, add 14"-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole.
- 2. Transmission sags are based on 500 ft ruling span.

..0-.6

.0-.9

477 T2-Hawk (26/7) ACSR B

..0-.9

6.0

12.4 kV 3-PHASE DISTRIBUTION FLOW IS SOUTH

2008 Normal Peak |= 183 amps

SEGMENT 2b

2018 Normal Peak

l= 235 amps l= 188 amps

Normal

l= 146 amps

Normal

ALLIANT ENERGY

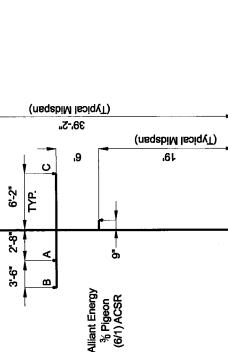
- 3. Distribution conductors are supported by midspan structure.
- 4. Transmission energized at 138 kV in 2008.

TRANSMISSION

A= 0 deg B= 240 deg C= 120 deg

DISTRIBUTION

A= 330 deg B= 210 deg C= 90 deg 乔



LOOKING TOWARD HUISKAMP SUBSTATION

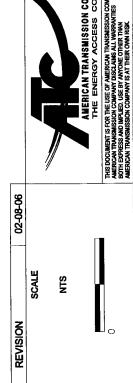
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TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 2b- LOOKING SOUTH ALONG WEST SIDE OF PATTON ROAD

FIGURE 13



NORTH MADISON - HUISKAMP ENGINEERING RECORD DRAWING No.

GENERAL DRAWINGS

EMF FIGURES

ER-10- 000059-013

NIMA - HKP 138 KV LINE FLOW IS SOUTH **TRANSMISSION**

Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole.

Note:

Distribution conductors are supported by midspan structure.

4. Transmission energized at 138 kV in 2008.

2. Transmission sags are based on 500 ft ruling span.

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9

"0-'8

"0-'8

SEGMENT 3 & 43a-1 2008 Normal Peak 2018 Normal Peak l= 327 amps l= 421 amps I= 872 amps Normal

12.47 kV 1-PHASE DISTRIBUTION **ALLIANT ENERGY** FLOW IS SOUTH

l= 698 amps

Normal

2008 Normal Peak 2018 Normal Peak l= 12 amps I= 10 amps l= 20 amps l= 16 amps **SEGMENT 3** Normal Normal

12.47 KV 1-PHASE DISTRIBUTION FLOW IS SOUTH

2008 Normal Peak SEGMENT 43a-1 2018 Normal Peak l= 5 amps l= 7 amps l= 4 amps Normal Normal

ALLIANT ENERGY

= 6 amps

6, . 0-0 ā 12 fiber OPGW (.551") Alliant Energy (6/1) ACSR 16 RAVEN 477 T2-Hawk (26/7) ACSR Shieldwire

TRANSMISSION

A= 0 deg B= 240 deg C= 120 deg

(Typical Midspan) .2-.6E

JISTRIBITION

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A= 330 deg B= 210 deg

C= 90 deg

(Lypical Midspan) ١6،

LOOKING TOWARD HUISKAMP SUBSTATION

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TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 43a-1 - LOOKING SOUTH ALONG WESTSIDE OF PATTON ROAD SEGMENT 3 - LOOKING SOUTH ALONG WESTSIDE OF PATTON ROAD

FIGURE 14

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AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

ENGINEERING RECORD DRAWING No.

NORTH MADISON - HUISKAMP

GENERAL DRAWINGS

EMF FIGURES

ER-10-000059-014

©AMERICAN TRANSMISSION COMPANY 2004 ER-10- 000059-015 Stated dimensions are at midspan, add 18*-2* ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 2. Transmission sags are based on 600 ft ruling span. **NORTH MADISON - HUISKAMP** 3. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS TRANSMISSION EMF FIGURES** KEY A= 0 deg B= 240 deg C= 120 deg ENGINEERING RECORD DRAWING No. Note: TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 43a -2 LOOKING SOUTH ALONG EAST SIDE OF PATTON ROAD (Typical Midspan) 25-10" ..0-.6 ..0-,9 <u>"0-'8</u> LOOKING TOWARD HUISKAMP SUBSTATION £ FIGURE 15 AMERICAN TRANSMISSION COMPANY THE ENERGY ACCESS COMPANY Œ 12 fiber OPGW (.551") 477 T2-Hawk (26/7) ACSR B **f** Shieldwire NMA - HKP 138 KV LINE FLOW IS SOUTH 2008 Normal Peak 2018 Normal Peak 02-08-06 **TRANSMISSION** SEGMENT 43a-2 l= 327 amps l= 872 amps 698 amps Normal Normal 11 SCALE SIN REVISION

NMA - HKP 138 KV LINE FLOW IS SOUTH **TRANSMISSION**

SEGMENT 43a-3 2018 Normal Peak 2008 Normal Peak l= 327 amps l= 421 amps l= 872 amps Normal

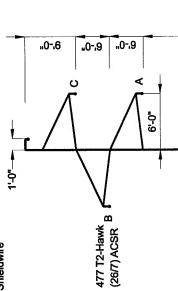
12.47 KV 1-PHASE DISTRIBUTION FLOW IS SOUTH ALLIANT ENERGY

l= 698 amps

Normal

SEGMENT 43a-3 2008 Normal Peak 2018 Normal Peak l= 1 amps = 2 amps l= 1 amps = 2 amps Normal Normal

12 fiber OPGW (.551") Shieldwire



Note:

- transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 1. Stated dimensions are at midspan, add 14'-4" ft. to the
- 2. Transmission sags are based on 500 ft ruling span.
- 3. Distribution conductors are supported by midspan structure.
- 4. Transmission energized at 138 kV in 2008.

TRANSMISSION

B= 240 deg C= 120 deg A= 0 deg 至

> (Typical Midspan) ..Z-.6E

> > ۱9

r B

Alliant Energy

(6/1) ACSR % RAVEN

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DISTRIBUTION

A= 330 deg B= 210 deg C= 90 deg KΕΥ

(Lypical Midspan) <u>،6</u>۱

LOOKING TOWARD HUISKAMP SUBSTATION

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TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 43a-3 - LOOKING SOUTH ALONG WEST SIDE OF PATTON ROAD

FIGURE 16



02-08-06

REVISION

THE ENERGY ACCESS COMPANY AMERICAN TRANSMISSION COMPANY

ENGINEERING RECORD DRAWING No.

NORTH MADISON - HUISKAMP GENERAL DRAWINGS EMF FIGURES

ER-10-000059-016

©AMERICAN TRANSMISSION COMPANY 2004 ER-10- 000059-017 Stated dimensions are at midspan, add 18'-2" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 2. Transmission sags are based on 600 ft ruling span. **NORTH MADISON - HUISKAMP** 3. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS TRANSMISSION EMF FIGURES** A= 0 deg B= 240 deg C= 120 deg ENGINEERING RECORD DRAWING No. Note: SEGMENT 45 - LOOKING WEST ON SOUTH SIDE OF CUBA VALLEY ROAD TO SCHUMACHER ROAD TRANSMISSION CURRENT FLOW IS WEST AS LOOKING DIRECTION INDICATES (Typical Midspan) .0-.9 .01-10 .0-.6 ..0-.9 LOOKING TOWARD HUISKAMP SUBSTATION ω Đ FIGURE 17 AMERICAN TRANSMISSION COMPANY
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AMERICAN TRANSMISSION COMPANY DISCLARED ALL WARRANTES
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AMERICAN TRANSMISSION COMPANY IS AT THEIR OWN RISK. 6-0 <u>-</u> 12 fiber OPGW (.551") 477 T2-Hawk (26/7) ACSR Shieldwire NMA - HKP 138 KV LINE FLOW IS WEST I= 327 amps 2018 Normal Peak 02-08-06 TRANSMISSION 2008 Normal Peak l= 698 amps I= 872 amps **SEGMENT 45** Normal Normal SCALE SE SE REVISION

©AMERICAN TRANSMISSION COMPANY 2004 ER-10-000059-018 Stated dimensions are at midspan, add 18*-2* ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 3. Distribution conductors are supported by midspan structure. 2. Transmission sags are based on 600 ft ruling span. **NORTH MADISON - HUISKAMP** 4. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS TRANSMISSION EMF FIGURES** A= 0 deg B= 240 deg C= 120 deg ENGINEERING RECORD DRAWING No. Note: TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 8b-1 - LOOKING SOUTH ON EAST SIDE OF SCHUMACHER ROAD (Typical Midspan) .01-.92 ..0-.6 ..0-.9 ..0-,9 LOOKING TOWARD HUISKAMP SUBSTATION £ FIGURE 18 6-0 AMERICAN TRANSMISSION COMPANY THE ENERGY ACCESS COMPANY THIS DOCUMENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY.
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MERICAN TRANSMISSION COMPANY IS AT THER ONN RISK \odot 12 fiber OPGW (.551") 477 T2-Hawk (26/7) ACSR B **f** Shieldwire TRANSMISSION NMA - HKP 138 KV LINE FLOW IS SOUTH 02-08-06 2008 Normal Peak l= 421 amps Normal 2018 Normal Peak l= 327 amps l= 698 amps SEGMENT 8b-1 l= 872 amps Normal SCALE SIN REVISION

©AMERICAN TRANSMISSION COMPANY 2004 ER-10- 000059-019 Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. Distribution conductors are supported by midspan structure. 2. Transmission sags are based on 500 ft ruling span. **NORTH MADISON - HUISKAMP** 4. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS TRANSMISSION** DISTRIBUTION **EMF FIGURES** A= 0 deg B= 240 deg C= 120 deg A= 330 deg B= 210 deg C= 090 deg 孟 ENGINEERING RECORD DRAWING No. Note: TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES SEGMENT 8b-2 - LOOKING SOUTH ON EAST SIDE OF SCHUMACHER ROAD (Typical Midspan) ..0-.6 .Z-.6E .0-.9 <u>"0-'8</u> LOOKING TOWARD HUISKAMP SUBSTATION (Typical Midspan) ١6، 9، £ FIGURE 19 8 AMERICAN TRANSMISSION COMPANY THE ENERGY ACCESS COMPANY THIS DOCUMENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY. MARKENAT TRANSMISSION COMPANY TOSALANS ALL WARRANTIES OF THE PER PROPESS AND IMPLED. USE BY ANYONE OTHER THAN MERCUAN TRANSMISSION COMPANY IS AT THE ROWN RISK. 5 Œ 12 fiber OPGW (.551") Waunakee Utilities #2 ACSR (6/1) Sparrow 477 T2-Hawk (26/7) ACSR B Shieldwire WAUNAKEE UTILITIES 7.2 kV 1-PHASE DISTRIBUTION FLOW IS NORTH TRANSMISSION NMA - HKP 138 KV LINE 02-08-06 FLOW IS SOUTH 2008 Normal Peak 2018 Normal Peak 2008 Normal Peak 2018 Normal Peak l= 421 amps l= 327 amps |= 872 amps SEGMENT 8b-2 SEGMENT 8b-2 l= 698 amps l= 1 amps l= 1 amps l= 2 amps l= 2 amps Nomal Normal Normal Normal SCALE SES REVISION

NMA - HKP 138 KV LINE FLOW IS SOUTH **TRANSMISSION**

2008 Normal Peak 2018 Normal Peak l= 327 amps t= 872 amps l= 421 amps l= 698 amps SEGMENT 13a Normal Normal

WAUNAKEE UTILLITIES 7.2 kV 3 PHASE DISTRIBUTION FLOW SOUTH

2008 Normal Peak 2018 Normal Peak l= 475 amps l= 475 amps l= 380 amps SEGMENT 13a l= 380 amps Normal Normal

12.47 KV 1-PHASE DISTRIBUTION FLOW SOUTH ALLIANT ENERGY

2008 Normal Peak 2018 Normal Peak SEGMENT 13a l= 3 amps l= 3 amps l= 6 amps l= 5 amps Normal Normal

..0-.6 ..0-.9 "0-'8 <u>.</u>0-9 12 fiber OPGW (.551") 477 T2-Hawk (26/7) ACSR B **(** Shieldwire

transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole.

1. Stated dimensions are at midspan, add 14'-4" ft. to the

Note:

Distribution conductors are supported by midspan structure.

4. Transmission energized at 138 kV in 2008.

TRANSMISSION

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A= 0 deg B= 240 deg C= 120 deg

Transmission sags are based on 500 ft ruling span.

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(Typical Midspan) 3 , 2 3'-6" 2'-8" Z Waunakee Utilities 336.4 Merlin (18/1) ACSR

36.-S 6، 3-0 Ω Alliant Energy #2 Sparrow

DISTRIBUTION

至

A= 330 deg B= 210 deg C= 90 deg

(6/1) ACSR

(Typical Midspan) ا6،

LOOKING TOWARD HUISKAMP SUBSTATION

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SEGMENT 13a - LOOKING SOUTH ALONG THE EAST SIDE OF SCHUMACHER ROAD TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES

FIGURE 20

NORTH MADISON - HUISKAMP GENERAL DRAWINGS

EMF FIGURES

ER-10- 000059 -020

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02-08-06

REVISION

SCALE

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SEGMENT 13b - LOOKING SOUTH ALONG THE WEST SIDE OF SCHUMACHER ROAD TRANSMISSION CURRENT FLOW IS SOUTH AS LOOKING DIRECTION INDICATES (Lypical Midspan) LOOKING TOWARD HUISKAMP SUBSTATION 36:-5" ..0-.6 ..0-.9 **"0-'8** (Typical Midspan) 52, 3-6 £ 6'-0" **FIGURE 21** 2-8<u>.</u> 0 2-8 z <u>က</u> \odot 12 fiber OPGW (.551") 477 T2-Hawk (26/7) ACSR B 1 Waunakee Utilities 336.4 Merlin (18/1) ACSR Shieldwire WAUNAKEE UTILLITIES 7.2 KV 3 PHASE DISTRIBUTION FLOW SOUTH NMA - HKP 138 KV LINE FLOW IS SOUTH 02-08-06 2008 Normal Peak 2018 Normal Peak 2018 Normal Peak **TRANSMISSION** 2008 Normal Peak l= 421 amps l= 327 amps I= 698 amps l= 475 amps I= 380 amps I= 475 amps l= 380 amps I= 872 amps SEGMENT 13b SEGMENT 13b Normal Normal Normal Normal SCALE NIS REVISION

Note:

- Stated dimensions are at midspan, add 14'-4" ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole.
- Transmission sags are based on 500 ft ruling span.
- 3. Distribution conductors are supported by midspan structure.
- 4. Transmission energized at 138 kV in 2008.

TRANSMISSION

A= 0 deg B= 240 deg C= 120 deg 而

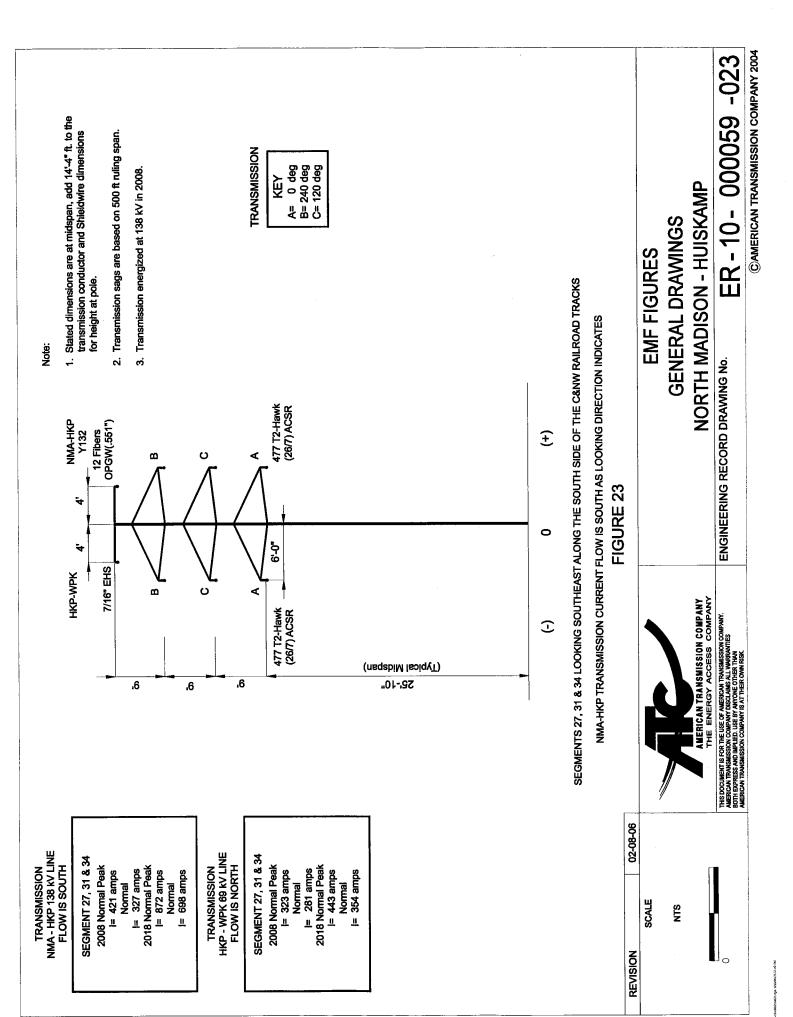
DISTRIBUTION

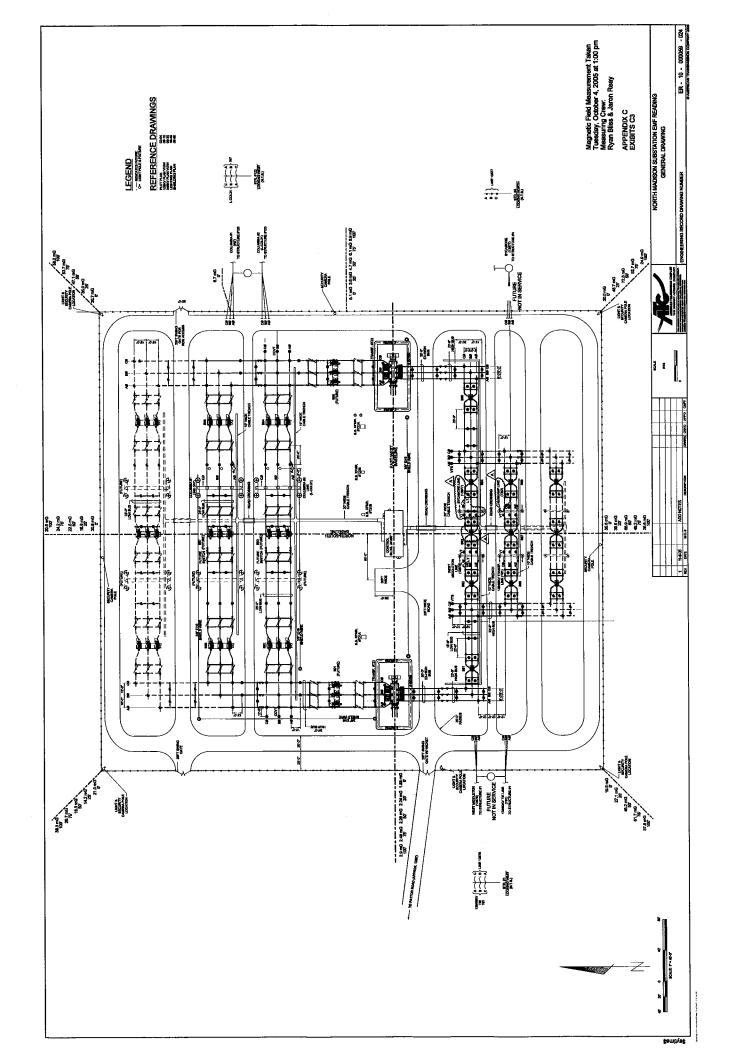
A= 330 deg B= 210 deg C= 90 deg Æ

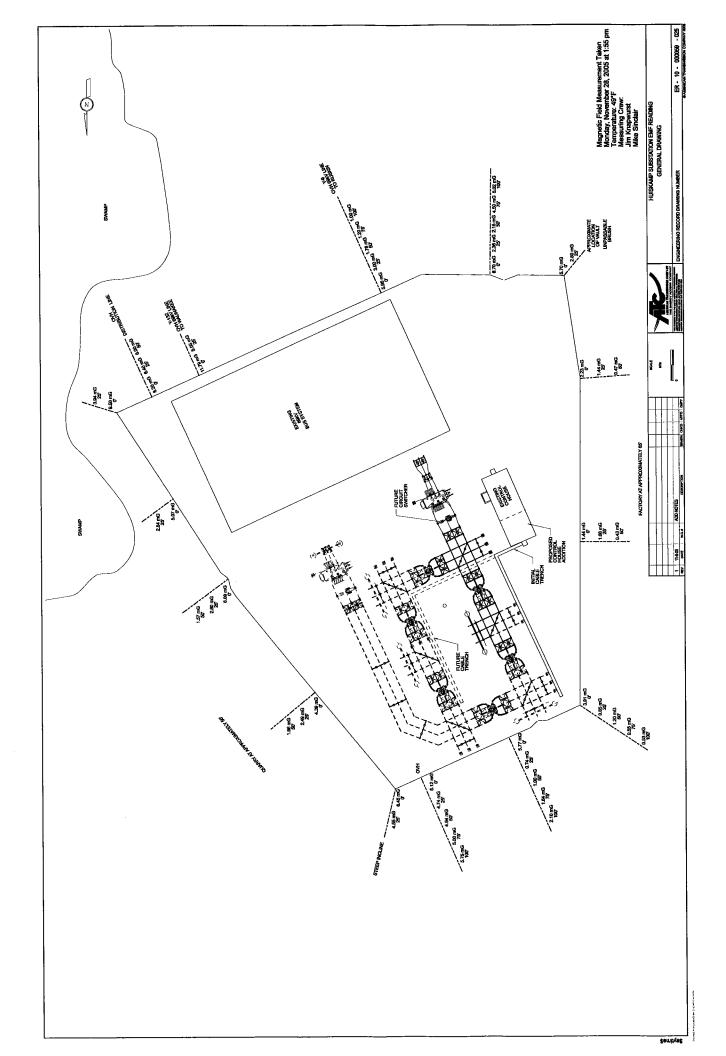
NORTH MADISON - HUISKAMP GENERAL DRAWINGS EMF FIGURES ENGINEERING RECORD DRAWING No. THE ENERGY ACCESS COMPANY **AMERICAN TRANSMISSION COMPANY**

ER-10- 000059 -021

©AMERICAN TRANSMISSION COMPANY 2004 ER-10-000059-022 1. Stated dimensions are at midspan, add 18*.2* ft. to the transmission conductor and Shieldwire dimensions for height at pole. For distribution conductors add 5 ft for height at pole. 2. Transmission sags are based on 600 ft ruling span. **NORTH MADISON - HUISKAMP** 3. Transmission energized at 138 kV in 2008. **GENERAL DRAWINGS TRANSMISSION EMF FIGURES** A= 0 deg B= 240 deg C= 120 deg SEGMENT 24 - LOOKING SOUTH ALONG RAEMISCH ROAD TO UNIEK DRIVE THEN WEST 500 FT. THEN SOUTH TO POINT OF INTERSECTION WITH THE Y132 69KV LINE ENGINEERING RECORD DRAWING No. Note: TRANSMISSION CURRENT FLOW IS SOUTH OR WEST AS LOOKING DIRECTION INDICATES (Lypical Midspan) .01-:9Z ..0-.6 "0-'8 <u>..0-'8</u> LOOKING TOWARD HUISKAMP SUBSTATION £ FIGURE 22 THE ENERGY ACCESS COMPANY **AMERICAN TRANSMISSION COMPANY** 0 Œ 12 fiber OPGW (.551") 477 T2-Hawk B **f** (26/7) ACSR Shieldwire NIMA - HKP 138 KV LINE FLOW IS SOUTH OR WEST 2018 Normal Peak 02-08-06 2008 Normal Peak l= 327 amps l= 421 amps = 872 amps 698 amps **SEGMENT 24** Normal Normal <u>II</u> SCALE NTS REVISION







©AMERICAN TRANSMISSION COMPANY 2004 ER-10-000059-026 Stated dimensions are at midspan, add 18'-2" ft. to the transmission conductor and Shieldwire dimensions for height at pole. **NORTH MADISON - HUISKAMP** 2. Transmission sags are based on 600 ft ruling span. **GENERAL DRAWINGS TRANSMISSION** 3. Transmission energized at 138 kV in 2008. **EMF FIGURES** KEY A= 0 deg B= 240 deg C= 120 deg ENGINEERING RECORD DRAWING No. Note: TRANSMISSION CURRENT FLOW IS EAST AS LOOKING DIRECTION INDICATES (Lypical Midspan) SEGMENT 1- LOOKING EAST TOWARD WIBU ROAD ..0-.6 ..0-.9 25-10" ..0-,9 LOOKING TOWARD YAHARA SUBSTATION £ FIGURE 26 AMERICAN TRANSMISSION COMPANY THE ENERGY ACCESS COMPANY THIS DOCUMENT IS FOR THE USE OF AMERICAN TRANSMISSION COMPANY.
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MARRICAN TRANSMISSION COMPANY IS AT THER OWN RISK. Œ 477 T2-Hawk (26/7) ACSR B **f** %" EHS STEEL Shieldwire TRANSMISSION NMA - YAR 138 KV LINE FLOW IS EAST 2008 Normal Peak l= 633 amps Normal 02-08-06 l= 479 amps SEGMENT 1 SCALE N_{TS} REVISION

